WHAT IS CLAIMED IS:

1.   An image processing method comprising:

the modify step of modifying a first image to obtain a second image on the basis of a first signal obtained by extracting an edge of the first image, and a second signal obtained by reducing the number of tone levels.

2.   The method according to claim 1, wherein the second signal is a signal processed by decreasing the number of tone levels of the first image and increasing brightness.

3.   The method according to claim 1, wherein the modify step includes the step of simultaneously generating the first and second signals as the second image.

4.   The method according to claim 3, wherein the modify step includes the step of generating the first and second signals by filtering the first image using a predetermined filter.

5.   The method according to claim 4, wherein the predetermined filter has coefficients, a sum total of which is positive.

6.   The method according to claim 5, wherein the predetermined filter has coefficients, a sum total of which is 2.

7. The method according to claim 5, wherein the predetermined filter has a pixel of interest having a positive coefficient, and all other pixels having negative coefficients.

8. The method according to claim 4, wherein the predetermined filter is a 5 pixel × 5 pixel filter.

9. The method according to claim 8, wherein the predetermined filter has a pixel of interest having a coefficient = 26, and all other pixels having coefficients = -1.

10. The method according to claim 4, wherein the predetermined filter is a 3 pixel × 3 pixel filter.

11. The method according to claim 4, wherein the predetermined filter is defined by that some of coefficients of the predetermined filter, for pixels other than a coefficient of a pixel of interest are "0".

12. The method according to claim 4, wherein the modify step includes the step of setting the filter on the basis of brightness of the first image.

13. The method according to claim 12, wherein the modify step includes the step of setting a larger sum total of coefficients in the filter as the first image is darker.

14. The method according to claim 13, further comprising the luminance distribution calculation step

of calculating a luminance distribution of the first

image, and

wherein the modify step includes the step of

detecting brightness of the first image on the basis of

5　　the luminance distribution.

15.　　The method according to claim 14, wherein the

modify step includes the step of detecting brightness of

the first image on the basis of an average luminance of

the first image.

10　16.　　The method according to claim 14, wherein the

luminance distribution calculation step includes the

step of generating a luminance histogram of the first

image.

17.　　The method according to claim 16, wherein the

15　modify step includes the step of detecting brightness of

the first image on the basis of a median of the

luminance histogram.

18.　　The method according to claim 16, wherein the

modify step includes the step of detecting brightness of

20　the first image on the basis of a maximum frequency

value of the luminance histogram.

19.　　The method according to claim 14, further

comprising the correction step of correcting the first

image on the basis of the luminance distribution, and

wherein the modify step includes the step of

setting the filter on the basis of a correction

condition generated in the correction step.

20. The method according to claim 4, wherein the

5 modify step includes the step of modifying the first

image in units of blocks each consisting of a

predetermined number of lines, and controlling a size of

the filter in accordance with an object line position

for modifying in the block.

10 21. The method according to claim 1, wherein the first

image is a photo image.

22. The method according to claim 21, further

comprising the decoding step of decoding the first image

if the first image is block-encoded.

15 23. The method according to claim 22, wherein the

modify step includes the step of modifying the first

image decoded in the decoding step to obtain the second

image after the first image is smoothed.

24. The method according to claim 21, wherein the

20 modify step includes the step of tentatively

block-encoding and decoding the first image when the

first image is not a block-encoded image, and then

modifying the first image to obtain the second image.

25. The method according to claim 1, further

25 comprising the output step of outputting the second

image onto a recording medium.

26.   The method according to claim 1, wherein the first signal is a signal obtained by extracting an edge having a thickness according to an attribute of the entire first image.

27.   The method according to claim 26, wherein the attribute of the entire first image is an image size.

28.   The method according to claim 26, wherein the attribute of the entire first image is an image resolution.

29.   The method according to claim 26, wherein the attribute of the entire first image is manually set.

30.   The method according to claim 1, further comprising:

the instruction input step of inputting a user instruction that selects a desired one of a plurality of modify modes; and

the image process step of executing an image process for image data using the modify mode corresponding to the user instruction, and

wherein the plurality of modify modes include an illustration mode for converting the first image into the second image in the modify step.

31.   The method according to claim 30, wherein the instruction input step includes the step of selecting the first image from a plurality of images, selecting the illustration mode as the modify mode for the first

~~image, and setting detailed modify contents in the~~
illustration mode.

32.   The method according to claim 31, wherein the modify step includes the step of setting a filter on the

5   basis of the detailed setup contents in the instruction input step, and generating the first and second signals by a filter process using the filter.

33.   The method according to claim 32, wherein the detailed setup contents include setups of brightness of

10   ~~the modified image.~~

34.   The method according to claim 33, wherein the modify step includes the step of setting a larger sum total of coefficients in the filter as brightness of the modified image set based on the detailed setup contents

15   ~~is higher.~~

~~35.   The method according to claim 31, wherein the~~ detailed setup contents include setups as to whether or not the modified image is grained.

36.   The method according to claim 35, wherein when the

20   detailed setup contents are set with grainy conversion of the modified image, the first image is controlled to have block distortion.

37.   The method according to claim 36, wherein when the detailed setup contents are set with grainy conversion

25   of the modified image, the first image is controlled to be a JPEG-encoded image.

38.   The method according to claim 30, wherein the plurality of modify modes further include a monochrome effect mode for converting the first image into a monochrome image.

39.   The method according to claim 38, wherein the image process step includes the step of executing the illustration mode for converting the first image into the second image and then executing the monochrome effect mode for converting the second image into a monochrome image when the user instruction designates both the illustration mode and the monochrome effect mode.

40.   The method according to claim 39, wherein the illustration mode includes the step of converting luminance and color difference signals of the first image, and

the monochrome effect mode includes the step of converting the color difference signals of the second image.

41.   The method according to claim 38, wherein the instruction input step allows to set a hue in the monochrome effect mode.

42.   The method according to claim 1, further comprising:

the segmentation step of segmenting the first image into a plurality of regions; and

the setting step of setting processing contents of ~~~~

each of the segmented regions, and

wherein the modify step includes the step of
modifying the first image in units of regions to obtain

5   the second image.

43.   The method according to claim 42, wherein the
segmentation step includes the step of obtaining a
plurality of regions by generating the first image in
units of regions.

10   44.   The method according to claim 42, wherein the
setting step includes the step of setting filters in
units of regions, and

        the modify step includes the step of generating
the first and second signals by executing a filter

15   process using the filters set in units of regions.

45.   The method according to claim 44, wherein the
setting step includes the step of setting a filter in
correspondence with a size of the region.

46.   The method according to claim 45, wherein the

20   setting step includes the step of setting a filter in
correspondence with the number of lines in the region.

47.   The method according to claim 44, wherein the
filter set in the setting step includes a filter having
different line and column sizes.

48.   The method according to claim 44, wherein the setting step includes the step of setting coefficients of the filter for each region.

49.   The method according to claim 48, wherein the

5   filter has coefficients, a sum total of which is positive.

50.   The method according to claim 49, wherein the filter has a pixel of interest having a positive coefficient, and all other pixels having negative

10   coefficients.

51.   The method according to claim 50, wherein the filter increases absolute values of coefficients for pixels other than a coefficients of a pixel of interest as a size of the filter is smaller.

15   52.   The method according to claim 51, wherein the filter has coefficients other than a coefficient of the pixel of interest, which are set to be powers of 2.

53.   The method according to claim 44, wherein the setting step includes the step of setting a

20   predetermined filter for a region having a size not less than a predetermined size.

54.   The method according to claim 44, wherein the setting step includes the step of setting the filter on the basis of a user instruction.

25   55.   An image processing apparatus comprising:

input means for inputting a first image;

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~~modify means for modifying the first image to~~

obtain a second image on the basis of a first signal

obtained by extracting an edge of the first image, and a

second signal obtained by reducing the number of tone

5   levels; and

output means for outputting the second image.

56.   The apparatus according to claim 55, wherein said

modify means obtains the second image by filtering the

first image using a predetermined filter.

10   57.   The apparatus according to claim 55, wherein said

output means prints out the second image on a recording

medium.

58.   The apparatus according to claim 55, wherein the

first signal is a signal obtained by extracting an edge

15   having a thickness according to an attribute of the

entire first image.

59.   The apparatus according to claim 55, further

comprising:

instruction input means for inputting a user

20   instruction that selects a desired one of a plurality of

modify modes; and

image process means for executing an image process

for image data using the modify mode corresponding to

the user instruction, and

wherein the plurality of modify modes include an illustration mode for converting the first image into the second image by said modify means.

60. The apparatus according to claim 59, wherein the plurality of modify modes further include a monochrome effect mode for converting the first image into a monochrome image.

61. The apparatus according to claim 60, wherein when the user instruction designates both the illustration mode and the monochrome effect mode, said image process means executes the illustration mode for converting the first image into the second image, and then executes the monochrome effect mode for converting the second image into a monochrome image.

62. The apparatus according to claim 55, further comprising:

segmentation means for segmenting the first image into a plurality of regions; and

setting means for setting processing contents of each of the segmented regions, and

wherein said modify means modifies the first image in units of regions to obtain the second image.

63. The apparatus according to claim 62, wherein said segmentation means obtains a plurality of regions by generating the first image in units of regions.

64.   An image processing system which connects an image
processing apparatus for generating a second image on
the basis of a first image, and an image output
apparatus for outputting the second image,

5   said image processing apparatus having modify
means for modifying the first image to obtain the second
image on the basis of a first signal obtained by
extracting an edge of the first image, and a second
signal obtained by reducing the number of tone levels.

10   65.   The system according to claim 64, wherein said
modify means obtains the second image by filtering the
first image using a predetermined filter.

66.   The system according to claim 65, wherein said
modify means executes different filter processes in

15   units of regions of the first image.

67.   The system according to claim 64, wherein said
image output apparatus is a printer for printing out the
second image on a recording medium.

68.   The system according to claim 64, further

20   connecting an image input apparatus for inputting the
first image to said image processing apparatus.

69.   The system according to claim 68, wherein said
image input apparatus is a digital camera for generating
an image signal by sensing an object image.

70.   The system according to claim 68, wherein said image input apparatus is a scanner for generating an image signal by optically scanning a photo.

71.   The system according to claim 64, wherein said image processing apparatus further has:

instruction input means for inputting a user instruction that selects a desired one of a plurality of modify modes; and

image process means for executing an image process for image data using the modify mode corresponding to the user instruction, and

the plurality of modify modes include an illustration mode for converting the first image into the second image by said edit means.

72.   The system according to claim 71, wherein the plurality of modify modes further include a monochrome effect mode for converting the first image into a monochrome image, and

when the user instruction designates both the illustration mode and the monochrome effect mode, said image process apparatus executes the illustration mode for converting the first image into the second image, and then executes the monochrome effect mode for converting the second image into a monochrome image.

73.   Storage medium storing a program code of an image process, said program code including at least:

a code of the modify step of modifying a first

image to obtain a second image on the basis of a first

signal obtained by extracting an edge of the first image,

and a second signal obtained by reducing the number of

5   tone levels.

74.   Storage medium storing a program implementing the

method according to any one of claims 2, 30, 38 and 42.

75.   Recording medium on which the second image

modified by the image processing method according to any

10   one of claims 1, 2, 30, 38 and 42 is formed.

76.   Recording medium on which an image that has

undergone processes for emphasizing an edge, reducing

the number of tone levels, and increasing brightness is

formed.